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EFFECT OF THIOUREA AND KINETIN ON SEED GERMINATION OF SYZYGIUM CUMINI (L.) SKEELS.

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ABSTRACT

Seed germination in response to various pre-sowing treatments was studied. The above experiment was conducted and observed that, Thiourea for 45 minutes and Kinetin for 60 minutes favoured maximum seed germination and enhancement in shoot length and root length.

KEY WORDS: *Syzygium cumini*, Germination, Shoot Length and Root Length.

INTRODUCTION:

Syzygium cumini (L.) Skeels, is a widely distributed forest tree in India and other tropical and sub tropical regions of the world. The tree has a great economic importance since most of the parts like the bark, leaves, seed and fruits are used as an alternative medicine to treat various diseases. Traditionally the Jambul fruits, leaves, seeds, and bark are all used in ayurvedic medicine. The bark contains tannins and carbohydrates, accounting for its long-term use as an astringent to combat ailments like dysentery (Veigas et al. 2007, Namasivayam et.al 2008; Stephen, A 2012). Fruits is used in well known traditional medicines to control the blood sugar level in the patients suffering from diabetes. In case of *S. cumini* the immature fruits which are green in colour first become pale green and transform to a white fruit. This white fruit stage starts accumulating pink colour which turns to a crimson colour and then at final stage. The purplish black ripe fruit appears. The fruit is commonly known as Jamun (Hindi), java plum, black plum, Jambul and Indian blackberry.The immature fruits are green in colour and the fruit goes through a number of developmental stages till it gets its purple black colour. It is a seasonal fruit and is consumed fresh for its nutrient value. Fruits are also processed to make jam, jellies, squash, vinegar and ice cream for its beautiful and attractive purple colour. Chaudhary and Mukhopadhyay (2012)**.** Vinegar prepared from the juice of the ripe fruit is used as stomachic, carminative and diuretic (Kiritikar and Basu, 1987). Therefore its seeds are considered difficult to store for longer term and thus are sensitive to drying (Pritchard *et al.,* 1999; Mittal *et al.,* 1999; Ouedraogo *et al.,* 1999., Srimathi *et al.,* 2001).The fruit has use for various medicinal purposes and currently use for the treatment of chronic diarrhea and other enteric disorders (Veigas, *et al.* 2007). Purplish black ripened have anthocyanin content in colour when ripe and have high anthocyanin content (Venkateswarlu 1952; Jain and Seshadri 1975) Anthocyanin accumulating fruits often display a range of intermediary colours during the fruit development which ranges from green to white to the final colour of the fruit with decreasing chlorophyll levels (Wheelwright and Janson 1985; Willson and, Thompson 1982.) The accumulation of the pigment finally gives the different shades of pink, red or dark purple colour to the fruits. The anthocyanin present in the fruit also contributes to the numerous health benefits of the fruit and is thus used in the traditional medicines to cure a number of diseases along with the other phytochemicals. The fruit is consumed fresh during the season for its high nutrient value. The fruit is acrid, sweet, cooling and removes bad smell from mouth, biliousness, stomachic, astringent, diuretic and antidiabetic (Nadkarni, 1976). The seed extract is used to treat cold, cough, fever and skin problems such as rashes and the mouth, throat, intestines and genitourinary tract ulcers (infected by *Candida albicans*) by the villagers of Tamil Nadu (Chandrasekaran and Venkatesalu, 2004). Freshly harvested Jaman seeds gave better germination percentage within 1-2 weeks and may loose their viability soon after shedding (Patil *et al.,* 1997; Mbuya *et al.,* 1994). Seed viability can be retained, in short term, if the seeds have maintained above critical moisture content i.e. 40-50% (Ouedraogo *et al.,* 1999;Srimathi *et el.,* 2001). The survival of seeds during short terms to range also depends on storage environment and seed moisture content, for example, loss of seed viability within 2-3 weeks when stored at 25-30 $^{\circ}$C (Srimathi *et al.,* 1999;Rawat and Nautiyal, 1997).

It is commonly propagated by seed and it has no dormancy, hence fresh seeds are sown immediately after extracting from fruits. Seed can be sown 4-5 cm deep in the nursery. There is occurrence of polyembryony in Jamun to the extent of 20-50%, hence nucellar seedling may be utilized to produce true to the type plants (Singh and Thakur 1977) .Hence there is an urgent need to conservation of dry land plants for the preservation of their diversity. Seeds is an effective means of achieving this goal, little information is available on the seed germination of *Syzygium cumini.* For need of healthy, quick growing of seedlings in short span of time from their sowing time. Keeping this in view the present study was carried out with the main objective .

MATERIALS AND METHODS:

1) **Collection of Seed Material:** In the present investigation seeds of the *Syzigium cumini* were widely collected from Mantha Taluka, District Jalna (M.S.) India. Collected seeds were then packed in sterile polythene bags in first week of June 2019. \

2) **Sowing of *Syzygium Cumini* Seeds:** Experiment was carried out in second week of June 2019 at Department of Botany, Swami Vivekanand Senior College, Mantha Dist-Jalna (M.S.) India. The seeds were sown during the months of June 2019. Seeds were first' surface sterilized for 1 min by immersing in 0.1 % $HgCI_2$ solution for 5 min and subsequently washed with distilled sterile water. The seeds were sown in Thin paper bags. The preferred Thin paper bags having size of 22.5 x 12.5 cm were used for sowing. In first experiment *Syzygium cumini* seeds were sown at different depth of 6cm in already soil filled polybags. Thin paper bags were filled with Mixed soil. To each Thin paper bags single seed was sown. The pots were saturated with water by surface irrigation. During plant growth pots were irrigated daily by spraying with water until water drained from the bottom of the pot. Germination was measured daily for 60 days. All plants were harvested to determine percent germination, shoot height, root length, number of leaves and collar diameter of shoots (Asgharipour, 2011).

RESULTS AND DISCUSSION:

The effect of Thiourea and Kinetin on seed of *Syzygium cumini* were treated with 15,30,45,60 minutes, 6 and 12 hours and percent germination, shoot length, root length, number of leaves and collar diameter of shoots in cm were observed. The results are mentioned in table 1and 2. It is clear from result summarized in table 1 that seeds of *Syzygium cumini* treated with Thiourea for 45 minutes were proved favorable to express maximum percent germination, root length, shoot length, number of leaves and collar diameter of shoots, while minimum in 15 minutes as compared with control. It was interesting to note that seed treated with Thiourea for 45 minutes showed maximum root length as compared with shoot length.

It is clear from table 2 that seeds of *Syzygium cumini* treated with Kinetin for 60 minutes were proved favourable to express maximum percent germination, shoot length, number of leaves and collar diameter of shoots as compared with control. It was interesting to note that seed treated with kinetin for 45 minutes and 60 minutes showed maximum root length as compared with shoot length. From the results of this study it is concluded that seed treated with Thiourea and Kinetin for 15, 30, 45 and 60 minutes improved both seed germination and growth of *Syzygium cumini* seedlings. Hence above treatment are recommended for *Syzygium cumini* nursery growers. Several workers have performed such types of experiment on seeds of medicinal plants. Gaikwad and Mule (2019) studied and concluded that Conc.H_2SO_4 and Conc. Hcl for 2 minutes favoured maximum seed germination and shoot length. Gaisamudre and Dhabe (2011) Observed that the seeds of *Meizotropis buteiformis* were treated with NaOH and KOH concluded that highest percentage of seed germination for KOH (85.2) and NaOH (72.2). Yawalikar et.al (2012) studied on the effect of chemical factors on seed germination of *Pentapetes phoenicea* and concluded that H_2SO_4 treatment for 20 minutes gives 98% of germination by breaking the dormancy. Gaikwad and Borkar (2018) observed that the KOH and NaOH on seed germination. It was observed that, 10% KOH and 10% NaOH favoured maximum seed germination of Syzygium cumuni. Maximum shoot length was noted at 5% KOH and 10% NaOH. On the other hand, root length was maximum at 10% KOH and 5%

NaOH.

Satya et.al (2018) Studied the effect of gibberlic acid on germination, growth and survival of jamun (*Syzygium cumini* L. Skeels .They observed four treatment of gibberlic acid comprised of G0 (control), G1 (GA3-150 ppm), G2 (GA3-300 ppm) and G3 (GA3-450 ppm). The study revealed GA3 at 450 ppm (G3) recorded minimum days taken to start germination (11.92), days taken to 50 % germination (14.67), highest germination percentage (90.00 %), shoot height (33.42 cm), maximum number of leaves (23.83), girth of stem (5.78 mm), highest root length (30.68 cm), No. of roots (101.75), fresh weight of shoot (11.71 gm) and root (5.53 gm), dry weight of shoot (2.70 gm) and root (1.34 gm) and germination percentage (88.47 %). Similarly Gaikwad (2019) studied and concluded that the influence of different growth regulators (IAA+ IBA and IAA+ NAA) on seed germination and seedling growth of *Syzygium cumuni*. It was observed that IAA + IBA at 600 ppm favoured maximum seed germination. On the other hand shoot length and root length was maximum at IAA+ NAA at 400 ppm. It is clear from table 3 that the seeds treated by Thiourea showed 08 different types of fungi namely *Alternaria alternata, Aspergillus niger, A. fumigatus, Aspergillus flavus, Fusarium moniliforme, F. oxysporum, Mucur* spp, and *Rhizopus stolonifer* seeds treated by and Kinetin showed 07 different types of fungi namely *Alternaria alternate, Aspergillus niger, A. fumigatus, Aspergillus flavus, F. oxysporum, Mucur* spp, *Rhizopus stolonifer.*

Table 1: Effect of Thiourea on seed germinability of *Syzygium cumini.*

Treatment Thiourea (Min./Hou.)	Germination (%)	Mean			
		Shoot Length (cm)	Root Length (cm)	No. of leaves	Collar Diameter (mm)
15 Minutes	30	12.24	17.29	10.4	7.8
30 Minutes	60	29.32	27.26	17.2	10.8
45 Minutes	80	33.49	40.81	19.5	12.6
60 Minutes	60	24.64	20.33	12.2	10.2
6 Hours	00	00	00	00	00
12 Hours	00	00	00	00	00
Control	30	16.38	10.20	9.3	8.4

Table 2: Effect of Kinetin on seed germinability of *Syzygium cumini.*

Treatment Kinetin (Min./Hou.)	Germination (%)	Mean			
		Shoot length (cm)	Root length (cm)	No. of leaves	Collar diameter (mm)
15 Minutes	40	10.51	10.11	10.3	8.3
30 Minutes	70	15.61	16.56	11.7	9.2
45 Minutes	80	25.89	32.37	17.3	10.8
60 Minutes	90	43.61	44.24	19.4	10.3
6 Hours	00	00	00	00	00
12 Hours	00	00	00	00	00
Control	40	12.14	14.11	9.5	7.6

Table 3: Incidence of mycoflora on infected seeds of *Syzygium cumini.*

Fungi.	Syzygium cumini	
	Incidence on seeds treated by Thiourea	Incidence on seeds treated by Kinetin
Alternaria alternata	+	+
Aspergillus flavus	+	+
Aspergillus fumigatus	+	+
Aspergillus niger	+	+
Fusarium moniliforme	+	--
Fusarium oxysporum	+	+
Mucur spp	+	+
Rhizopus stolonifer	+	+

-- =Absent + = Present.

CONCLUSIONS:

Pre-sowing treatment of seed of *Syzygium cumuni* plays vital role to enhance the seed germination under nursery conditions. Among the pre-sowing treatments, the best treatment for the sowing of seeds are Thiourea for 45 minutes and Kinetin for 60 minutes favoured maximum seed germination, root length and shoot length of Syzygium cumuni. Therefore, pre-sowing treatments of Thiourea for 45 minutes and Kinetin for 60 minutes may be recommended for plantation programme.

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